

S-29  
50-348/364 - CIVP  
2/13/92

Staff Exh. 29

**Bechtel E&E**  
Engineers - Con

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SEP 17 1987

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In reply refer to AP-13525

Mr. W. G. Hairston, III  
Alabama Power Company  
600 North 18th Street  
Post Office Box 2641  
Birmingham, Alabama 35291-0400

Dear Mr. Hairston:

Joseph M. Farley Nuclear Plant Units 1 and 2  
Bechtel Jobs 7597-011/021  
Electric Hydrogen Recombiner Splices -  
Justification for Continued Operation  
(PCR NO. 87-0-4441)  
Bechtel Files A-78, E-91  
AP-13525

In a telephone call on September 17, 1987, APCo (Mr. D. H. Jones) requested Bechtel to provide justification for continued operation for Electric Hydrogen Recombiners that use a splice connection between the heater leads and the field cable. The requested justification for continued operation (JCO) is attached. Our evaluation is based in part on a typical splice configuration (Appendix A to the JCO) prepared by APCo.

If you have any questions or comments, please contact us.

Yours very truly,

K. C. Gandhi  
Project Engineer

KCG/AJD/DGB:raw

Enclosure:

As stated above

cc: J. R. Crane, w/l  
J. D. Woodard, w/l  
J. E. Garlington, w/l  
R. G. Berryhill, w/l  
D. H. Jones, w/l

NUCLEAR REGULATORY COMMISSION

Docket No. 50-348/364 Official Ex. No. 51121

In the matter of ARC

Staff \_\_\_\_\_ IDENTIFIED 2/11/92

Applicant \_\_\_\_\_ RECEIVED 2/13/92

Intervent \_\_\_\_\_ REJECTED \_\_\_\_\_

File Off \_\_\_\_\_ DATE \_\_\_\_\_

Contractor \_\_\_\_\_ WITHIN \_\_\_\_\_

Other \_\_\_\_\_  
Reporter L. Estep

SUBJECT: Evaluation of splices used on Hydrogen Recombiner heater leads to field cables.

| EQUIPMENT: | <u>RECOMBINER</u> | <u>JUNCTION BOX</u> |
|------------|-------------------|---------------------|
|            | Q1E17K001A-A      | Q1E17G001A-A        |
|            | Q1E17K001B-B      | Q1E17G001B-B        |
|            | Q2E17K001A-A      | Q2E17G001A-A        |
|            | Q2E17K001B-B      | Q2E17G001B-B        |

## 1. INTRODUCTION

The Hydrogen Recombiner is supplied with a power junction box located on the outside of the Recombiner enclosure (see Westinghouse drawing 7189D19). The power junction box contains 5 sets (A, B, C & N) of heater leads from the five heater banks. Each heater lead is provided with a Hylug YAV8C-L3 ring tongue connector. Field cable consists of 4-1/C #1/0 (Cable Code J08) Okonite cables. Each single conductor (phase and neutral) is connected to the corresponding five conductors from the heater banks.

This evaluation assumes that the field cable to heater bank lead terminations have been made using a bolted lug connection which is insulated by Okonite T95/T35 tape materials. It is assumed that the existing thickness and splice overlaps are as shown on the sketch included as Appendix A.

## EVALUATION

During normal plant operation the Hydrogen Recombiners are de-energized. The Recombiner are manually actuated after LOCA initiation, if required, based on the applicable emergency operating procedure. In addition, the Recombiners are tested (every 6 months) and inspected (every 18 months) per technical specification paragraph 4.6.4.2. These tests and inspections include heater sheath operating temperatures up to 700F, visual inspections of the cables in the power junction box and Recombiner enclosure, and insulation resistance checks of the heater electrical circuits.

Okonite's test report (NQRN-3) qualified a 5KV taped inline splice using T95/T35 tape materials. These tape materials have a qualified life of over 40 years at 90C

operating temperature, 200 MRad's radiation exposure and a DBE with a peak of 345F and 114 psig.

The Farley total integrated dose of 50 MRads for inside containment is far less than 200 MRad's test level and Okonite's test temperature and pressure provide adequate margins over FNP design basis LOCA conditions. The power junction box provides additional protection from the direct chemical spray on the splices, and insulates the field cable and terminations from the internal Hydrogen Recombiner temperature rise during operation.

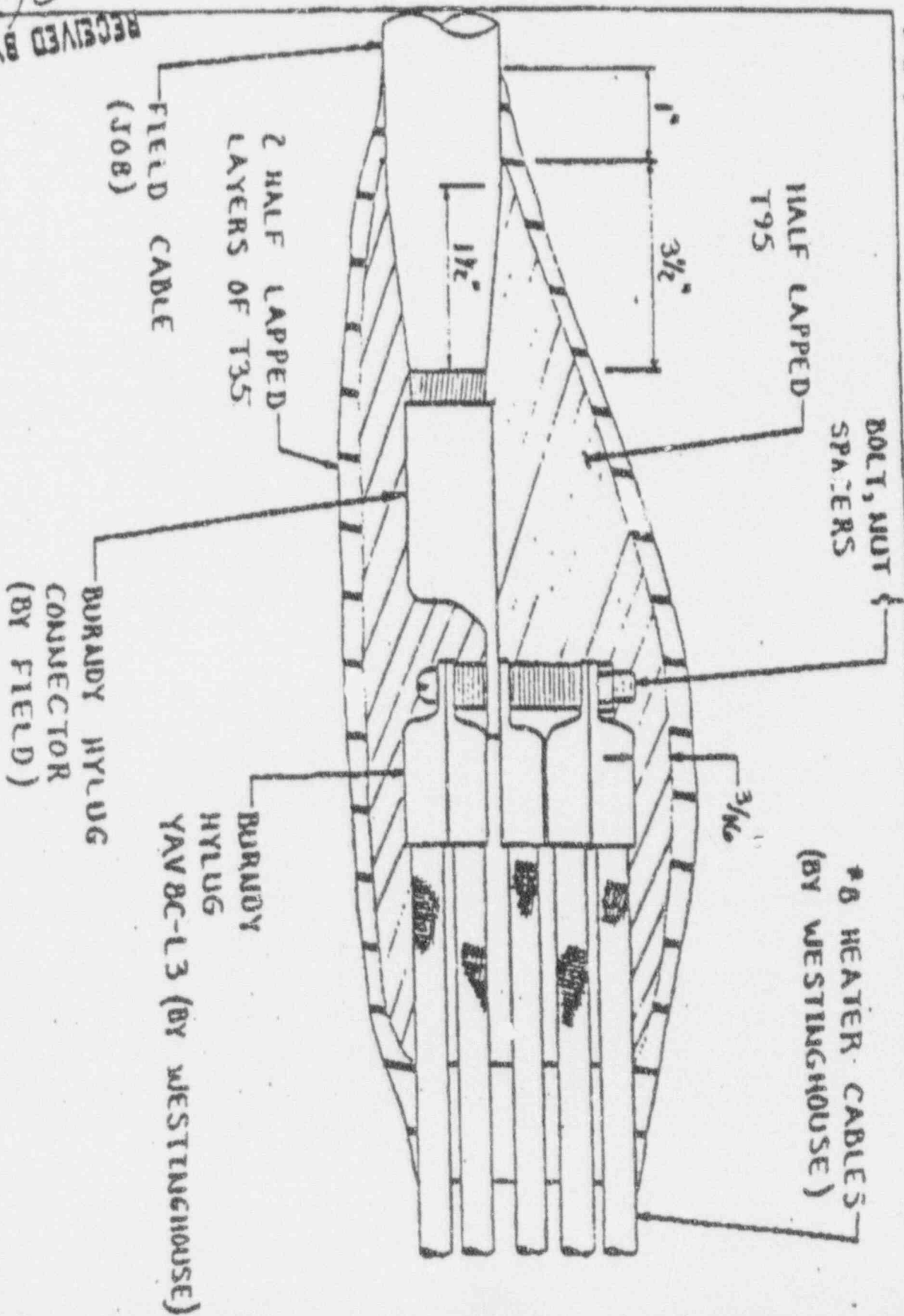
The thickness of the T95 insulating tape installed per the attached Appendix A detail provides adequate phase to phase and phase to ground electrical insulating properties for 600 Volts service.

Performance of the technical specification surveillance requirements shows that the integrity of electrical circuits is maintained when the Recombiner heaters are energized.

#### CONCLUSION

The splice configuration shown in Appendix A coupled with the qualification tests performed by Okonite provides reasonable assurance that this splice detail will perform its intended function in the relevant environments. Therefore, continued operation of Farley Nuclear Plant Units 1 and 2 is justified.

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9/17/84  
FACHTEL JOB 7597



ASSUMED IN RECOMBINER TERMINATION CONFIGURATION  
TYPICAL FOR 3 PHASES AND NEUTRAL